



UNITED STATES PATENT AND TRADEMARK OFFICE

lin
UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/064,668	08/05/2002	June-Min Yao	MXIP0037USA	5323

27765 7590 05/07/2003

NAIPO (NORTH AMERICA INTERNATIONAL PATENT OFFICE)
P.O. BOX 506
MERRIFIELD, VA 22116

EXAMINER

BOOTH, RICHARD A

ART UNIT	PAPER NUMBER
----------	--------------

2812

DATE MAILED: 05/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/064,668

Applicant(s)

YAO ET AL.

Examiner

Richard A. Booth

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8-14 is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-7 are rejected under 35 USC 103(a) as being unpatentable over Pearce et al., U.S. Patent 6,358,865 in view of Barsan et al., U.S. Patent 5,672,521.

Pearce et al. shows the invention substantially as claimed including a method of forming multiple oxide layers by performing an oxidation process, the semiconductor substrate comprising a silicon surface 100, the silicon surface comprising a first region (leftmost region of fig. 1) and a second region (rightmost region of fig. 1), the method comprising: forming a resist film 110 on the silicon surface to cover both the first region and the second region; forming a mask layer on the surface of the sacrificial oxide layer;

Art Unit: 2812

defining and patterning the mask layer to form a first opening having a first predetermined surface area, and a second opening having a second predetermined area, the first opening and the second opening formed in portions of the mask within the first region and portions of the mask within the second region, respectively, to respectively expose portions of the sacrificial oxide layer having a surface area equal to the first predetermined surface area, and portions of the sacrificial oxide layer having a surface area equal to the second predetermined surface area; performing a linear doping process with an oxidation rate varying dopant to simultaneously implant ions with a first predetermined concentration and ions with a second predetermined concentration into the first region and the second region, respectively, through the first opening and the second opening, respectively, wherein a ratio of the first predetermined surface area to the second predetermined surface area is defined as a constant k ; removing the mask layer; removing the sacrificial oxide layer; and performing an oxidation process to form a first silicon oxide layer having a first predetermined thickness and a second silicon oxide layer having a second predetermined thickness in the first and second regions, respectively (see figs. 1-7 and col. 2-line 55 to col. 4-line 27).

Pearce et al. fails to expressly disclose forming a sacrificial oxide layer and wherein the oxidation varying dopant is nitrogen, although the reference does disclose the use of nitrogen for varying oxidation rates (see col. 5-lines 36-48).

Barsan et al. discloses implanting nitrogen into two different regions of a semiconductor substrate to vary the oxidation rate so as to form two different oxide

Art Unit: 2812

regions of different thickness (see figs. 6a-6d and col. 5-lines 16-57) using a sacrificial oxide layer 12 with a thickness of 150 angstroms (see col. 3-lines 34-39). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Pearce et al. so as to replace the fluorine ions with nitrogen ions because nitrogen ions can also be used to affect the oxidation rate and to use a sacrificial oxide layer as disclosed by Barsan et al. because this can be used to protect the silicon substrate.

With respect to claims 2 and 7, it would have been a function of routine experimentation to adjust the openings in the primary reference of Pearce et al. so as to, for example, form one opening with a greater area, for example, depending upon a variety of factors, for example, the desired length of the device or the desired spacing between adjacent devices and such a limitation would not render patentability to the claims without the showing of unexpected results. It also would have been a function of routine experimentation to adjust the nitrogen doses in order to achieve the desired oxidation rate.

Concerning claim 6, Pearce et al. discloses where the substrate can be an SOI substrate (see col. 2-lines 44-46).

Allowable Subject Matter

Claims 8-14 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: the prior art, either singly or in combination, fails to anticipate or render obvious, the

Art Unit: 2812

limitations of: forming a mask layer comprising a first opening with a first predetermined surface area in portions of the mask layer within the first region, and multiple second openings, each second opening having a second predetermined surface area, in portions of the mask layer within the second region, on the surface of the sacrificial oxide layer to respectively expose portions of the sacrificial oxide layer having a surface area equal to the first predetermined surface area, and portions of the sacrificial oxide layer, each having a surface area equal to the second predetermined surface area; and performing an oxidation process to form a first silicon oxide layer having a first predetermined thickness, and a second silicon oxide layer having a second predetermined thickness, in the first and second regions, respectively, as required by independent claim 8.

.Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard A. Booth whose telephone number is 308-3446. The examiner can normally be reached on Monday-Thursday from 7:30-6:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on 308-3325. The fax phone numbers for the organization where this application or proceeding is assigned are 308-7724 for regular communications and 308-7724 for After Final communications.

Application/Control Number: 10/064,668

Page 6

Art Unit: 2812

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-1782.


Richard A. Booth
Primary Examiner
Art Unit 2812

May 5, 2003